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Parental Awareness and Preference towards Autism Screening in Dammam, Khobar, and Qatif in Eastern Province, Saudi Arabia.

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ABSTRACT: Background: Autism spectrum disorder (ASD) is one of the most common lifelong neurodevelopmental diseases diagnosed in children. This study aimed to evaluate the level of parental awareness and preference toward autism screening in Eastern Province, Saudi Arabia.
Methods: A cross-sectional study was conducted on 423 parents in 29 primary health care centers (PHCS) in three different sectors: Dammam, Khobar, and Qatif in the Eastern Province of Saudi Arabia.
Results: 37.6% participants had a 'low' level of knowledge, 52.2% had a 'medium' level, and 10.2% had a 'high' level of knowledge about ASD. There was a statistically significant relationship between the preference to screen during well-baby clinic visits and total knowledge ($p < 0.017$). There was a significant association between parents agreeing to their child having a friend with ASD and their willingness to screen online and on-site ($p < 0.001$ and $p < 0.015$, respectively). There were significant associations between total knowledge and agreeing that all children with ASD deserve a special form of education and agreeing to their children befriending a child with ASD ($p = 0.001$ and 0.003, respectively).
Conclusion and Recommendations: The level of knowledge about autism in this study sample was medium. Significant efforts should be made to raise knowledge through awareness campaigns. Further studies are needed to create and implement a screening tool in accordance with the recommendations of the American Academy of Pediatrics.

Keywords: Autism spectrum disorder, Knowledge, Attitude, Preference, Screening

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1. Introduction

Autism spectrum disorder (ASD) is one of the most common neurodevelopmental diseases in children worldwide. Its main symptoms are impaired social skills, communication, and associated stereotype behaviors.[1] It is also believed that ASD is associated with other psychiatric disorders, such as anxiety, depression, attention deficit hyperactivity disorder (ADHD), and behavioral problems.[2] Research continues to investigate the causes and risk factors of autism; however, the exact pathways remain unknown.[3]
The prevalence of autism across Saudi Arabia is variable. One study published in 2007 reported the prevalence of confirmed cases of autism to be 59 per 10,000 children.[4] Moreover, a study published in 2013 in Taif revealed that 0.031% of male patients were diagnosed with autism compared to 0.004% of females.[5] Parents should pay attention to many alarming signs of ASD, including delayed language development, repetitive behavior, non responsiveness to names, and communication delays.6 The average age at diagnosis is 3.1 years,[7] with a male-to-female ratio of 3:1. Although there is currently no cure for ASD, research has shown that early detection, intervention, and intensive behavioral therapy improves outcomes and prognosis.[8]
Reviewing the literature demonstrates that the first studies on autism were conducted in the 1960s and that mild types of autism were not identified until the 1980s. Since then, additional studies on autism have increased knowledge, reflecting an increased level of awareness.[9] Since parents are the primary caregivers who are most likely to detect any unusual behavior n children, their level of awareness should be high to

recognize the alarming signs and symptoms of autism and respond accordingly.[5]

Over the years, there have been several international studies on public awareness of autism, all of which are important to this research. One study conducted in Pakistan tested parental awareness. Results showed that 75% of the study participants had heard of autism; however, most demonstrated low knowledge scores concerning correct opinions on autism and knowledge of signs and symptoms.[9]

Numerous studies on this topic have been conducted in China. One study conducted on Harbin caregivers concluded that 57.8% of the study participants could recognize autism. Recognition depended on sex, residential area, age, and educational level. Regarding the attitudes toward mental health service use for autism, 84.6% chose to visit a health organization for treatment and 68.2% chose to consult a psychotherapist.[10]

Another study conducted in China in 2016 aimed to explore preschool teacher's knowledge of autism. Results showed that knowledge was lacking among the teachers, with almost 83% providing inaccurate responses to more than half of the questionnaire.[11]

In 2020, a study was conducted to compare the public knowledge and stigma of the autism spectrum among 1254 Chinese citizens compared to 1127 United States (US) citizens who were approached online. The study results showed large differences in public perspectives on ASD. Only 57%–65% of Chinese citizens demonstrated good knowledge compared to 86%–91% of the US citizens. Moreover, 14% of the US citizens were shown to have stigma beliefs toward ASD compared with 38% of the Chinese citizens.[12]

One study aimed to assess both parents of autistic and non-autistic children and health professionals in Nepal, and results showed a striking lack of awareness of autism by the 106 parents and health professionals. Furthermore, most participants believed that environmental factors were crucial causes of autism.[13]

University students have also been the focus of several studies. In 2019, a study conducted in Zambia with 488 students showed that 79% had never heard of autism before the survey. Significant variations in autism knowledge were explained by sex, having children, Internet use, and education level.14 In Mumbai, one study conducted on 201 senior medical students resulted in a mean of 11.85 ± 3.15 scores out of 19 in a questionnaire assessing autism knowledge, which was considered low.[15] In Istanbul, Turkey, a study conducted on 175 medical and nursing students concluded that 78.9% were aware of autism, whereas 21.1% were unaware.[16]

A large-scale study conducted on the general population in Northern Ireland incorporated 1204 participants and was published in 2013. The participants were assessed for autism awareness, knowledge, and perceptions regarding interventions. The study concluded that a high level of autism awareness was present in the study sample: over 80% were aware of ASD and over 60% knew someone with ASD in their own family, circle of friends, or work colleagues.[17]

In recent years, there has been a growing interest in ASD studies in the Gulf region and Arab countries. However, research on several aspects of autism are lacking. Only a few studies have explored the level of awareness among different populations within the region.[8,18]

A cross-sectional study was conducted to assess schoolteachers' awareness of ASD in Oman's urban region. A total of 164 teachers were randomly selected from five schools. Misconceptions about autism spectrum disorder were found to be frequent among public school teachers in the country.[19]

Studies have also been conducted in the KSA. A study conducted in Riyadh revealed the need for improved levels of autism awareness among the public.[1] A similar study conducted to assess challenges among families of autistic children in Eastern Province revealed that public awareness of the disease is still lacking.[20] A different study conducted in Riyadh to assess public awareness regarding knowledge and attitude toward autism showed that the public still has some misconceptions about the disease.[2] Screening of autism in primary health care centers (PHC) in KSA is not well established. A study conducted at John Hopkins Aramco Hospital regarding the implementation of a screening tool for autism in PHCs emphasized the importance of screening and early intervention for autism by increasing parental awareness and acceptance of screening. [21]

To the best of our knowledge, only two studies have been conducted in Saudi Arabia to assess public awareness toward autism. Both were conducted in Riyadh and revealed a low level of awareness and recommended further studies. Moreover, neither study addressed parental preferences toward screening or implementing a screening tool.

Parental awareness toward autism may lower the threshold for suspecting autism and seeking professional help, which will facilitate early diagnosis and lead to better outcomes. Furthermore, exploring parental preferences toward autism screening will help in health planning, implementation of autism screening, and better utilization of autism services.

Therefore, this study intended to answer the research question:

What is the level of parental awareness and preference toward autism screening in Dammam, Khobar, and

Qatif in the Eastern Province of Saudi Arabia?

The aim of this research is to evaluate parental' awareness and preference toward autism screening in Dammam, Khobar, and Qatif in the Eastern Province of Saudi Arabia.

The objectives of this research are to assess parental knowledge toward autism in Dammam, Khobar, and Qatif in Eastern Province, Saudi Arabia, to evaluates parental attitudes toward autism in Dammam, Khobar, and Qatif in Eastern Province, Saudi Arabia, to explores parental preferences toward autism in Dammam, Khobar, and Qatif in Eastern Province, Saudi Arabia, to evaluates the association between parental awareness and demographic data in Dammam, Khobar, and Qatif in Eastern Province, Saudi Arabia. And finally, to evaluate the association between parental awareness and preference for screening in Dammam, Khobar, and Qatif in Eastern Province, Saudi Arabia.

2. Methodology

This was a descriptive, cross-sectional study. This design was chosen to reflect the current level of awareness of autism in a specific population at a fixed point in time with the possibility of including a larger population. The study was conducted between 2021 and early 2022, from 8 am to 4 pm, at well-baby clinics at the Ministry of Health's PHCs under the E1 cluster in three different sectors: Dammam, Khobar, and Qatif in Saudi Arabia. The target population included parents of toddlers who lived in Eastern Province during the study period. They were approached in the waiting areas of primary healthcare centers. Participants were selected using a systematic random technique: every 3rd patient attending the well-baby clinic was selected and included in our sample. Inclusion criteria of this research are Saudi and non-Saudi parents of toddlers who lived in Eastern Province during the study period and were willing to participate. The exclusion are parents of children with autism, people with special training in autism, and parents who could not read Arabic. A multistage sampling technique was utilized by dividing the PHC distribution into three clusters. A total of 72 PHCs were identified (30 in Dammam, 11 in Khobar, and 31 in Qatif). By dividing the total number of PHCs by 72, PHC selection was performed using systemic sampling after considering the proportion of PHC in the clusters: 42% of the sample size was from 13 PHCs in Dammam, 15% from 2 PHCs in Khobar, and 43% from 14 PHCs in Qatif. Participants were selected using a systematic randomization technique until the sample size representing each cluster was reached. The total adult population of the Eastern Province is approximately 4 million. The sample size was 423 and was calculated using the Raosoft sample size online calculator by adding 10%, and taking into consideration a margin of error of 5%, confidence level of 95%, and response distribution of 50%

Study variables of this research are demonstrated in Table 1.

Table 1: Study Variables

Background data/independent variables	Age	Sex	Nationality	City	Marital status	Education	Income	Occupation	Number of children	Dealing with children with autism
Descriptive data/dependent variables	Knowledge	Attitude	Preference							

Background data were studied as independent variables for parental knowledge and attitudes (dependent variables) in Study Objective 4.

Parental awareness (knowledge and attitude) was studied as a dependent variable on preference (dependent variables) in Study Objective 5.

Data were collected using a self-administered questionnaire in the Arabic language that was divided into four main parts:

Part 1: included the background data of the participants.

Part 2 (knowledge) and Part 3 (attitude): obtained from an already validated English questionnaire from an article titled Autism Knowledge among the public in Saudi Arabia. Author name: Yousef Almana, Ahmed Alghamdi, and Laila Al-Ayadhi2. It was translated into Arabic by a translator, then back translated to English by a bilingual person whose native language is English, and was compared with the original version to achieve an accurate description of the translated questionnaire.

Part 4 (preference): assessed by adding variables extracted from an extensive literature review.

A pilot study was conducted to test language clarity among a minimum of 30 individuals that were not part of the study. Modifications were made accordingly (Cronbach's $\alpha = 0.753$). Appendix 1 provides an English version of the questionnaire. All analyses were conducted using IBM SPSS statistical package version 28.0.1. Descriptive statistics were used to assess the demographic data of the study participants and main

variables (knowledge, attitude, and preference for screening). Continuous variables were expressed as mean (X) and standard deviation (σ), while categorical variables were measured as percentages and frequencies. Knowledge scores were coded by assigning a 1 to each correct answer and a 0 to each incorrect or "I do not know" answer. Knowledge scores for all questions were summed and analyzed as a new variable, "the total knowledge," with a range of 0 to 12, and good internal consistency (Cronbach's $\alpha = 0.753$). Knowledge scores used in this study were concordant with what was used in a previous national study.25 Participants who achieved a score higher or equal to 11 (>85%) were judged to have a 'high' level of knowledge, while scores of 10 to 6 (60-85%) were considered 'medium.' A score lower than 6 (<60%) was considered 'low.' Attitudes and study sample preferences for screening were analyzed individually for each question. Chi-square test ($\chi 2$) was used at a confidence interval of 95% to determine the association between categorical variables. Independent sample t-tests compared means of two groups, and one-way analysis of variance (ANOVA) compared means of three or more groups. Statistical significance was set at $p < 0.05$.

3. Results

Questionnaires were distributed to 423 parents from PHCs, with no missing data. The demographic data of the participants are shown in Table 2.

Table 2. Sociodemographic Data of the Study Sample (n = 423).

Study variables	Frequency (n)	Percentage (%)
Age		
Less than 20	31	7.3
20-29	163	38.5
30-39	154	36.4
40 or more	75	17.7
Gender		
Male	157	37.1
Female	266	62.9
Nationality		
Saudi	367	86.8
Non-Saudi	56	13.2
Residency		
Dammam	156	36.9
Khobar	70	16.5
Qatif	197	46.6
Marital status		
Married	358	84.6
Divorced	37	8.7
Widowed	28	6.6
Number of children		
One	94	22.2
Two	100	23.6
Three or more	229	54.1
Level of education		
No formal education	20	4.7
Elementary School	29	6.9
Intermediate School	38	9.0
Secondary school	103	24.3
College and higher Education	233	55.1
Occupation		
Unemployed	151	35.7
Medical field	115	27.2
Educational field	58	13.7
Others	99	23.4
Monthly income (Saudi Riyal)		

Less than 5000	146	34.5
5000-10000	152	35.9
More than 10000	125	29.6
Dealt with or encountered a patient with ASD		
Yes	95	22.5
No	228	77.5
Heard of ASD		
Yes	391	92.4
No	32	7.6

Table 2 shows that of the 423 parents enrolled in the study, 38.5% of the participants were between 20–29 years of age, followed by 30–39 (36.4%). More than half were female (62.9%), with the majority being Saudis (86.8%). The residency of the study participants was mostly from Qatif, followed by Dammam and Khobar (46.6%, 36.9%, and 16.5%, respectively). Most were married (84.6%), and almost half had three or more children (54.1%). The level of education for over half of the study participants was college or a high degree (55.1%). For occupation, 35.7% were unemployed, 27.2% were in the medical field, 13.7% were in the educational field, and 23.4% belonged to other sectors. The monthly income of 34.5% of participants was less than 5000 SR, 35.9% were between 5000-10000 SR, and 29.6% earned more than 10000 SR. Only 22.5% of study participants had dealt with or encountered a patient with ASD. Almost all participants (92.4%) had heard of ASD.

Figure (1) illustrates that 156 (37.6%) participants had a ‘low’ level of knowledge about ASD, 221 (52.2%) had a 'medium' level of knowledge, and 43 (10.2%) had a 'high' level of knowledge.

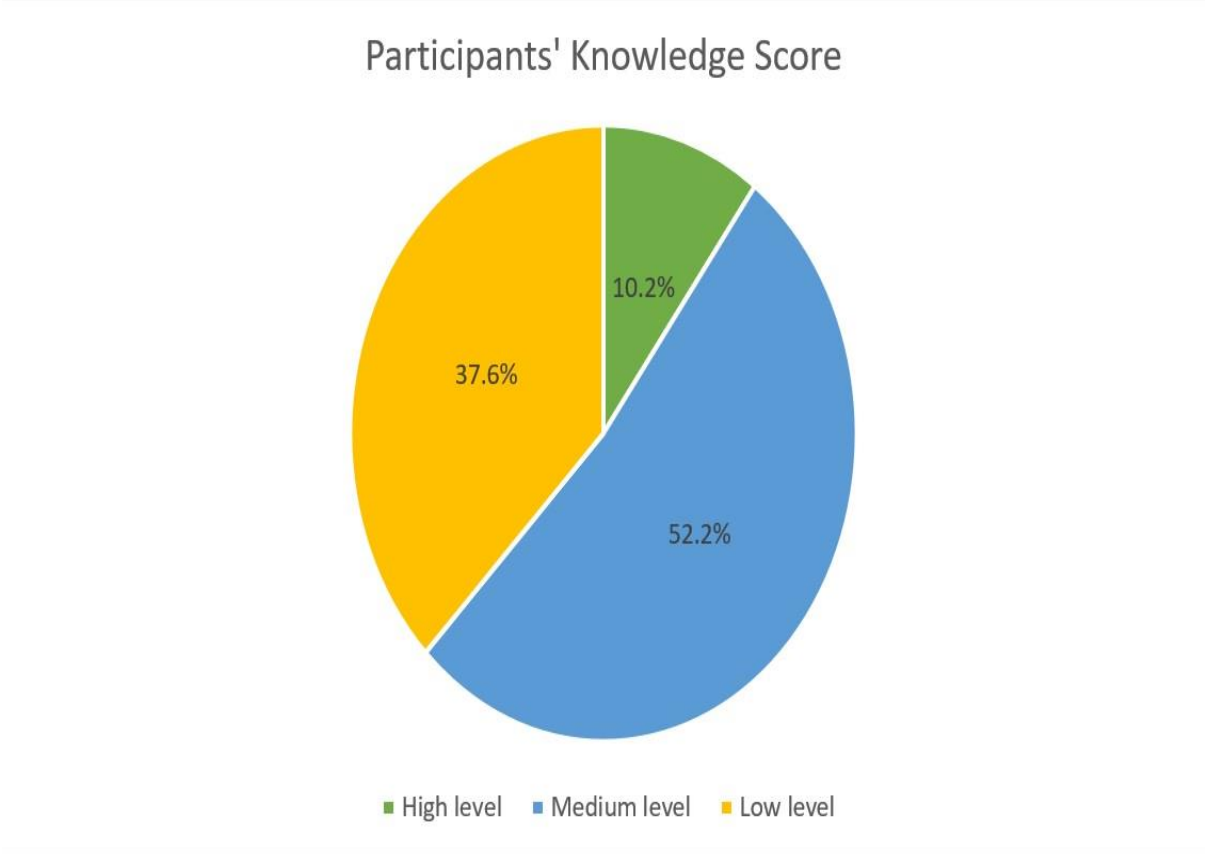

Table 3. Study Sample knowledge' Answers (n=423).

	Study variables		
No	Knowledge Questions	Frequency (n)	Percentage (%)
1	Is ASD a communicable disease		
	Wrong answer	62	14.7
	Correct answer	361	85.3
2	Most children do not show attachment, even to parents		
	Wrong answer	282	66.7
	Correct answer	141	33.3
3	ASD tends to run in families		
	Wrong answer	293	69.3
	Correct answer	130	30.7
4	Is ASD organic in nature		
	Wrong answer	189	44.7
	Correct answer	234	55.3
5	Is ASD caused by failure of parenting?		
	Wrong answer	127	30
	Correct answer	296	70
6	Is ASD caused by pregnancy's complication?		
	Wrong answer	229	54.1
	Correct answer	194	45.9
7	Is ASD caused by food or allergy?		
	Wrong answer	154	36.4
	Correct answer	269	63.3
8	Is ASD caused by mother vaccination during pregnancy?		
	Wrong answer	203	48
	Correct answer	220	52
9	Is ASD related to child vaccination		
	Wrong answer	117	41.8
	Correct answer	246	58.2
10	Is ASD caused by jinn "the devil" actions?		
	Wrong answer	124	29.3
	Correct answer	299	70.7
11	What is the best current treatment approach?		
	Wrong answer	157	37.1
	Correct answer	266	62.9
12	Early intervention can lead to significant gains in children's social and communication skills		
	Wrong answer	62	14.7
	Correct answer	361	85.3

Table 3 shows the12-item knowledge questions and the participants' responses in regard to ASD. For questions 1 and 12, 85.3% of participants answered the questions correctly. However, for questions 2 and 3, nearly two-thirds of participants answered incorrectly. Half of the study samples answered questions 4, 6, 8, and 9 correctly. For questions 5, 7, 10, and 11, nearly two-thirds of the participants answered correctly.

Table 4. Data Description of Study Sample Awareness and Preference to Screen (n=423).

Study variables		
Knowledge	Mean ($\bar{X}$)	Standard deviation (σ)
Total knowledge	7.13	2.877
Attitude	Frequency (n)	Percentage (%)
All children with ASD should receive a special form of education services at school		
Agree	349	82.5
Disagree	38	9
I don't know	36	8.5
Agree their children befriend a person with ASD		
Agree	256	60.5
Disagree	93	22
I don't know	74	17.5
Agree their children marrying a person with ASD		
Agree	105	24.8
Disagree	157	37.1
I don't know	161	38.1
Preference		
Prefer their children to be screened for Autism at their 18 and 24 months at a well-child visit		
Yes	343	81.1
No	52	12.3
I don't know	28	6.6
Prefer filling out the screening form online before the appointment		
Yes	297	70.2
No	89	21
I don't know	37	8.7
Prefer filling the screening form onsite at the clinic		
Yes	288	68.1
No	103	24.3
I don't know	32	7.6

Table 4 shows that 50% of the study participants answered 7.13 out of 12 questions correctly, with a standard deviation of 2.877.

Regarding attitude toward ASD, most participants agreed that all children with ASD should receive special education services at school (349 participants; 82.5%). In comparison, 38 participants disagreed and 36 neither agreed nor disagreed (9% and 8.5%, respectively). The majority of participants (60.5%) agreed to their children befriending a person with ASD, while 22% disagreed, and 17.5% did not know. When participants were asked whether they agreed to their children marrying a person with ASD, 105 participants agreed, 157 participants disagreed, and 161 answered that they did not know (24.8%, 37.1%, 38.1%, respectively). The majority of participants (81.1%) preferred their children to be screened for autism, with 343 participants answering yes, whereas the remaining group answered no or did not know (12.3%, 6.6%, respectively). When comparing participants' preferences regarding the screening method, preference for completing the online form before the appointment scored the highest, followed by completing the form onsite at the clinic (70.2%, 68.1%, respectively). A total of 89 participants did not prefer completing online forms before the appointment, whereas 103 did not prefer completing the form onsite at the clinic (21%, 24.3%, respectively).

Table 5. The Association Between the Study Sample Demographic Data with their Awareness

Demographic Data	Frequency and (percentage)	Total Knowledge Score Mean (Out of 12)	Total Knowledge Score Standard deviations	Attitude Frequencies and (percentage)								
				Question 1			Question 2			Question 3		
				Yes	No	I Don't Know	Yes	No	I Don't Know	Yes	No	I Don't Know
Age p-value (< 0.05)		0.062		0.000			0.002			0.003		
Less than 20	31 (7.3)	6.96		18 (58)	8 (25)	5 (16)	12 (38)	13 (41)	6 (19)	11 (35)	9 (25)	11 (35)
20-29	163 (38.5)	7.6		138 (84)	9 (5)	16 (11)	98 (60)	40 (24)	25 (15)	53 (32)	46 (28)	64 (40
30-39	154 (36.4)	6.8		138 (89)	12 (7)	4 (4)	104 (67)	29 (18)	21 (13)	32 (20)	69 (44)	53 (36)
40 and more	75 (17.7)	6.8		55 (73)	9 (12)	11 (14)	42 (56)	11 (14)	22 (29)	9 (12)	33 (44)	33 (44)
Gender p-value (< 0.05)		0.551		0.245			0.015			0.001		
male	157 (37.1)	6.8	2.95	125 (79)	14 (9)	18 (12)	89 (56)	46 (29)	22 (14)	50 (32)	64 (41)	43 (27
female	266 (62.9)	7.3	2.81	224 (84)	24 (9)	18 (6)	167 (62)	47 (17)	52 (19)	55 (20)	93 (34)	118 (44)
Nationality p-value (< 0.05)		O.605		0.000			0.320			0.970		
Saudi	367 (86.8)	7.1	2.8	314 (85.5)	25 (6.8)	28 (7.6)	218 (59.4)	81 (22.7)	68 (18.5)	91 (24.7)	137 (37.3)	139 (37.8)
Non-Saudi	56 (13.2)	6.9	2.9	35 (62.5)	13 (23.2)	8 (14.2)	38 (67.8)	12 (21.4)	6 (10.7)	14 (25)	20 (35.7)	22 (39.2)
Residency p-value (< 0.05)		0.037		0.016			0.153			0.176		
Dammam	156 (36.9)	6.7		121 (77.5)	14 (8.9)	21 (13.3)	85 (54.1)	40 (25.4)	31 (19.7)	30 (19.1)	59 (37.5)	67 (42.6)
Khobar	70 (16.5)	7		55 (78.5)	7 (10)	8 (11.4)	39 (55.7)	18 (25.7)	13 (18.5)	16 (22.8)	29 (41.4)	25 (35.7)
Qatif	197 (46.6)	7.5		173 (69.6)	17 (8.6)	7 (3.5)	132 (67)	35 (17.7)	30 (15.2)	59 (30)	69 (35)	69 (35)
Marital Status p-value (< 0.05)		0.272		0.000			0.777			0.056		
Married	358 (84.6)	7.218		310 (80.3)	19 (4.9)	29 (7.5)	219 (56.7)	75 (19.4)	64 (16.5)	88 (22.7)	125 (32.3)	145 (37.5)
Divorced	37 (8.7)	6.89		22 (59)	11 (29.7)	4 (10.8)	22 (59)	10 (27)	5 (13.5)	7 (18.9)	20 (54)	10 (27)
Widowed	28 (6.6)	6.3		17 (60.7)	8 (28.5)	3 (10.7)	15 (53.5)	8 (28.5)	5 (17.8)	10 (35.7)	12 (42.8)	6 (21.4)
Number of Children p-value (< 0.05)		0.204		0.900			0.105			0.217		
One	94 (22.2)	7.5		78 (82.9)	40 (42.5)	6 (6.3)	57 (60.6)	27 (28.7)	10 (10.6)	26 (27.6)	33 (35.1)	35 (37.2)
Two	100 (23.6)	7.24		83 (83)	8 (8)	9 (9)	55 (55)	24 (24)	21 (21)	18 (18)	35 (35)	47 (47)
Three or more	229 (54.1)	6.921		188 (62.8)	20 (8.7)	21 (9.1)	144 (62.8)	42 (18.3)	43 (18.7)	61 (26.6)	89 (38.8)	79 (34.4)
Level of Education p-value (< 0.05)		0.001		0.000			0.003			0.080		
No formal education	20 (4.7)	7.1		12 (60)	2 (10)	6 (30)	6 (30)	11 (55)	3 (15)	8 (40)	6 (30)	6 (30)
Elementary	29 (6.9)	6.4		18	5	6	14	6	9	7	14	8

school				(62)	(17.2)	(20.6)	(48.2)	(20.6)	(31)	(24.1)	(48.2)	(27.5)
Intermediate school	38 (9)	5.6		29 (76.3)	6 (15.7)	3 (7.8)	23 (60.5)	10 (26.3)	5 (13.1)	14 (36.8)	16 (42.1)	8 (21)
Secondary school	103 (24.3)	6.8		84 (81.5)	11 (10.6)	8 (7.7)	57 (55.3)	25 (24.2)	21 (20.3)	27 (26.2)	40 (38.8)	36 (34.9)
Collage and higher education	233 (55.1)	7.592		206 (88.4)	14 (6)	13 (5.5)	156 (66.9)	41 (17.5)	36 (15.4)	49 (21)	81 (34.7)	103 (44.2)
Occupation p-value (< 0.05)		0.000		0.749			0.315			0.185		
Unemployed	151 (35.7)	6.1		119 (78)	18 (11.9)	14 (9.2)	88 (58.2)	36 (23.8)	27 (17.8)	33 (21.8)	58 (38.4)	60 (39.7)
Medical field	115 (27.2)	8.6		99 (86)	7 (6)	9 (7.8)	71 (61)	26 (22.6)	18 (15.6)	28 (24.3)	35 (30.4)	52 (45.2)
Educational field	58 (13.7	7.39		49 (84.4)	5 (8.6)	4 (6.8)	43 (74.1)	7 (12)	8 (13.7)	13 (22.4)	27 (46.5)	18 (31)
others	99 (23.4)	6.6		82 (82.8)	8 (8)	9 (9)	54 (54)	24 (24)	21 (21)	31 (31)	37 (37)	31 (31)
Monthly Income p-value (< 0.05)		0.000		0.851			0.433			0.741		
Less than 5000	146 (34.5)	6.3		118 (80)	13 (8.9)	15 (10.5)	90 (61.6)	31 (21.2)	25 (17.1)	41 (28)	53 (36)	52 (35.6)
5000-10000	152 (35.9)	7.2		126 (82.8)	13 (8.5)	13 (8.5)	94 (61.8)	37 (24.3)	21 (13.8)	33 (21.7)	60 (39.4)	59 (38.8)
More than 10000	125 (29.6)	7.9		105 (84)	12 (9.6)	8 (6.4)	72 (57.6)	25 (20)	28 (22.4)	31 (24.8)	44 (35.2)	50 (40)
Dealt With or Encounter a Patient With ASD p-value (< 0.05)		0.08		0.773			0.013			0.158		
Yes	95 (22.5)	7.9	2.3	78 (82)	10 (9.5)	7 (7.3)	65 (68.4)	23 (24.2)	7 (7.3)	30 (31.5)	29 (30.5)	36 (37.8)
no	228 (77.5	6.9	2.9	271 (70.9)	28 (7.3)	29 (7.5)	191 (50)	70 (18.3)	67 (17.5)	75 (19.6)	128 (33.5)	125 (39.7)
Heard of ASD p-value (< 0.05)		0.233		0.000			0.000			0.499		
Yes	391 (92.4)	7.2	2.8	334 (85.4)	29 (7.4)	28 (7.1)	248 (63.4)	77 (19.6)	65 (16.6)	95 (24.2)	148 (37.9)	148 (37.9)
no	32 (7.6)	5.7	3.3	15 (46.8)	9 (28.12)	8 (25)	8 (25)	16 (50)	8 (25)	10 (3.2)	9 (28.12)	13 (40.6)

Key: question 1 of the attitude= All children with ASD should receive a special form of education services at school, Question 2 of the attitude= agree their children befriend a person with ASD, question 3 of attitude= agree their children marry a person with ASD.

Table 5 shows the statistically significant association between the age of the study participants and attitude. Agreeing that all children with ASD should receive a special form of education was significantly associated with nationality, residency, marital status, level of education, and those who had heard of ASD. The association between parents agreeing to their children befriending a person with ASD was associated with sex, level of education, and those who dealt with or heard of ASD. Regarding the total knowledge of the participants, there was a significant association with residency, level of education, occupation, and monthly income.

Table 6. The Association Between Study Sample Awareness and Preference to Screen

	Total knowledge p-value (< 0.05)	Attitude p-value (< 0.05)		
Preference		Question 1	Question 2	Question 3
Question 1	0.017	0.037	0.093	0.129
Question 2	0.001	0.069	< 0.001	0.843
Question 3	0.023	0.638	0.015	0.311
Attitude				
Question 1	< 0.001			
Question 2	0.003			
Question 3	1.66			

Key: question 1 of the attitude= All children with ASD should receive a special form of education services at school, question 2 of the attitude= agree their children befriend a person with ASD, question 3 of attitude= agree their children marry a person with ASD, question 1 of the preference = Prefer their children to be screened for Autism at their 18 and 24 months at the well-child visit, question 2 of preference= Prefer filling the screening form online before the appointment, question 3 of the preference= Prefer filling the screening form onsite before the appointment.

The preference of the study sample to screen their children at 18-24 months of age during well-baby clinic visit with both methods (online and onsite) were significantly associated with total knowledge of the study sample (p = 0.017, 0.001, and 0.023, respectively), as shown in Table 6. Regarding the attitude of the study sample, which was evaluated using three questions, there was a strong association between parents agreeing to their child having a friend with ASD and their willingness to screen online and onsite. Furthermore, there was a significant association between those who agreed that all children deserve a special form of education and their general preference for screening (first question). There was a strong association between total knowledge of the study sample and their attitude in the form of agreeing that all children with ASD deserve a special form of education and agreeing to their children befriending a child with ASD (p = 0.001 and 0.003, respectively).

4. Synopsis of the Main Research Outcomes

Parental awareness toward autism is essential for its recognition. Since parents are the primary caregivers, their level of awareness may lower the threshold for suspecting autism and seeking professional help, which may help in early diagnosis and better outcomes through early intervention. Furthermore, exploring parental preferences toward autism screening will help in health planning, implementation of autism screening, and better utilization of autism services. This study aimed to evaluate the level of parental awareness and preference toward autism screening in the Eastern Province of Saudi Arabia.

Although 92% of study participants had heard of autism, the study showed that approximately half had a medium level of knowledge. This is a considerable improvement compared to previous national studies done across Saudi Arabia among the general population that revealed a lack of awareness and the need for improvement.[1,20,2] Moreover, this lack of awareness about ASD included but was not limited to the public, as it involved teachers,[22, 23] healthcare providers,[8, 24,] and mothers of autistic children.[25] Several international studies have indicated a lower level of ASD knowledge among the general population. One study conducted in Pakistan with a comparable sample size (n= 339), objectives, and knowledge items included in the current study demonstrated that 75% of their study participants had heard of autism, and most had poor knowledge scores.[6] A higher level of knowledge in this study compared to previous studies might be influenced by the fact that more than half of the study participants were academics and had a higher college degree. Additionally, the Internet and social media platforms currently have a major influence on the level of awareness. Participants' occupation and level of education were essential factors influencing their level of knowledge, and these associations aligned with that found in the literature.[10] A significant association was also found between participants' residency and their level of knowledge, although the reason is unknown as this is the first study done in the region; hence, further studies are required. When highlighting community attitudes toward autism, the results in the present study were consistent with that found in previous studies. [2,6] The results demonstrate that the majority of people believe that children with ASD should receive a special form of education at school, in line with previous studies that explored this belief. Most parents were not against the idea of their children befriending children with autism, but were less likely to accept the idea of their children marrying someone with

autism. We believe that this may be due to the fear of long-term consequences and an unknown inheritance pattern.

5. Conclusions and Further Directions of Research

The level of knowledge regarding autism in this study sample was medium; therefore, significant efforts should be made to raise knowledge levels through awareness campaigns. Health providers should also educate parents on the warning signs of ASD whenever possible. As online methods are becoming more convenient, telemedicine resources should be utilized. In addition, most of the parents in the present study supported the idea that children with autism should receive a special form of education services; therefore, autism services and institutes should be widely implemented, as parents believe this will have a positive effect on autism prognosis. Since the majority of the study participants were willing to screen their children, further studies are needed to create and implement a screening tool that is extremely sensitive to detect autism at 18–24 months of age during well-baby visits, in accordance with the recommendation of the American Academy of Pediatrics.[26]

6. Limitations, Implications.

To the best of our knowledge, this is the first study to demonstrate parental preferences for screening for autism. The strong preference toward agreeing upon autism screening could contribute to early recognition and intervention, subsequently resulting in better outcomes.
The primary strength of this study is the sampling technique, as the sample was normally distributed among the three clusters. To our knowledge, this is the first study conducted to explore parental preferences toward screening. The current study has some limitations. The cross-sectional design reflects only the current awareness of autism in a specific population at a fixed point in time, as well as the temporality of the association among the studied variables. Another limitation is the lack of a standardized universal awareness measurement tool to assess the level of knowledge among different populations and compare them fairly. The questionnaire included only 12 items to test knowledge, which may not be sufficient for accurate measurement.

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